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HYPERTENSION AND LIFE SATISFACTION: A COMMENT AND REPLICATION OF BLANCHFLOWER AND OSWALD (2007)

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Abstract

This study examines the relationship between hypertension and life satisfaction using objective measures of hypertension from the Survey of Health, Ageing and Retirement in Europe (SHARE). Our results confirm the analysis in Blanchflower and Oswald (2007): there is a significant negative correlation between high blood-pressure problems and life satisfaction.

Keywords

Hypertension, blood pressure, life satisfaction

JEL Classification

I10, I12, I19

1. INTRODUCTION[*]

In a recent study, Blanchflower and Oswald (2007)[1] analyze the relationship between hypertension and happiness across countries. They show that there is an inverse relationship between a measure of psychological well-being and a measure of high blood-pressure, namely happier countries report less hypertension. This is an important result as hypertension may provide an interesting and more objective measure on the well-being of a country's population. Furthermore, this result also provides support for the validity of cross-national measures of subjective well-being.

Blanchflower and Oswald's paper use data from the Eurobarometer survey – a survey conducted in 2001 in 15 European countries. The survey question relating to hypertension is worded as follows: *"Would you say that you have had problems of high blood pressure?"* Answers could be given in four different categories: not at all; no more than usual; rather more than usual; much more than usual.

In their analysis, the authors make one important assumption: *"[…] individuals know whether a doctor has informed them that they suffer from blood-pressure problems. […] The assumption of our paper is that people can provide survey answers to questions about high blood-pressure difficulties in a relatively objective way"* (Blanchflower and Oswald, 2007, p. 4). The authors also stress that *"individuals who said yes [to the above question] had obtained such information from doctors"* (Blanchflower and Oswald, 2007, p. 8). Finally, Blanchflower and Oswald state that the persuasiveness of their paper rests on the assumption that *"it is reasonable to treat survey evidence on high-blood-pressure problems as a proxy for*

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[1] David G. Blanchflower and Andrew J. Oswald, "Hypertension and Happiness across Nations", *Journal of Health Economics* (forthcoming).

objective hypertension" (Blanchflower and Oswald, 2007, p. 18). They do conclude their paper, however, with the statement that *"future work needs to collect information on objective measures of hypertension and subjective measures of well-being"* (Blanchflower and Oswald, 2007, p. 18).

It is, in our opinion, at least questionable whether the wording of the high-blood-pressure question in the Eurobarometer can be treated as a "proxy for objective hypertension". First, there is no mention in the question on the severity of the blood-pressure problem – apart from the possibility of answering that ones blood-pressure problems were "more than usual". Blood-pressure values of 80-140 could be termed "more than usual" in certain age groups, yet is most probably not very alarming. A second concern with the wording of the Eurobarometer question on hypertension is that there is no time reference, i.e. an individual that last suffered from a "more than usual" blood-pressure problem a decade ago would be registered in Blanchflower and Oswald's analysis as an individual suffering from hypertension. In fact, it is not uncommon that in certain periods of one's life a degree of hypertension could arise (e.g. pregnancy, work related stress, exam stress, etc.). Finally, the authors' assumption that individuals who said "yes" had obtained such information from doctors need not be the case; individuals who have a certain personality traits (e.g. negative affectivity) may be inclined to assume that they have had blood-pressure problems. This latter point in particularly worrisome as such individuals would answer a question on life satisfaction or happiness in a similar way, which could explain the very significant correlation between their life satisfaction and blood-pressure variables in Table 6 (Blanchflower and Oswald, 2007, p. 31). As the authors themselves state: *"It might be conjectured that the paper's correlation is illusory and a product of the fact that an inherently cheery nation will be optimistic about everything. This is an important potential concern"*. However, the authors stress that *"it is not easy to believe that someone told <u>by their doctor</u> that they have a condition of high blood-*

pressure has an incentive to conceal this point" (Blanchflower and Oswald, 2007, p. 18; underline introduced by us). This is true, yet, based on the Eurobarometer question, we cannot assume that the respondent "was told by their doctor". This is, in our opinion, no mere triviality.

The aim of this paper is to use an alternative dataset that has better information on hypertension, namely the Survey on Health, Ageing and Retirement in Europe (SHARE). Our analysis supports the conclusions made by Blanchflower and Oswald (2007). We show that even with objective measures of hypertension a negative relationship between high blood-pressure problems and life satisfaction can be observed.

2. DATA AND METHODS

We use data from the Survey on Health, Ageing and Retirement in Europe (SHARE).[2] SHARE is a multidisciplinary and cross-national database of micro data on health, socio-economic status, and social and family networks of individuals aged 50 or over and their spouses. Eleven countries have contributed data to the 2004 SHARE baseline study which we use in our analysis. They are a balanced representation of the various regions in Europe, ranging from Scandinavia (Denmark and Sweden) through Central Europe (Austria, France, Germany, Switzerland, Belgium, and the Netherlands) to the Mediterranean (Spain, Italy and Greece). Further data have been collected in 2005-06 in Israel.[3]

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[2] The following description of the SHARE dataset is taken from the official homepage www.share-project.org.

[3] SHARE is co-ordinated centrally at the Mannheim Research Institute for the Economics of Aging. It has been designed after the role models of the U.S. Health and Retirement Study (HRS) and the English Longitudinal Study of Ageing (ELSA). Compared to HRS and ELSA, SHARE has the advantage to encompass cross-national variation of public policies, cultures and histories in a variety of European countries. This advantage makes SHARE a unique and innovative data set.

Data collected include health variables (e.g. self-reported health, physical functioning, cognitive functioning, health behaviour, use of health care facilities), psychological variables (e.g. psychological health, well-being, life satisfaction), economic variables (current work activity, job characteristics, opportunities to work past retirement age, sources and composition of current income, wealth and consumption, housing, education), and social support variables (e.g. assistance within families, transfers of income and assets, social networks, volunteer activities).

In our analysis we are particularly interested in the following two questions relating to hypertension:

- *Has a doctor ever told you that you had any of the conditions on this card? …high blood pressure or hypertension?* (0 – no; 1 – yes)
- *Do you currently take drugs at least once a week for problems mentioned on this card? …drugs for high blood pressure?* (0 – no; 1 – yes)

The question related to life satisfaction is worded as follows:

- *How satisfied are you with your life in general?* (1 – very unsatisfied; 2 – somewhat satisfied; 3 – somewhat unsatisfied; 4 – very satisfied)

One possible concern about analysing the SHARE dataset is that it is restricted to individuals aged 50 and older and their spouses. This could give rise to a bias. However, with data from SHARE it can be shown that 72% of all individuals suffering from hypertension are 50 years and older.[4] We analyse a sample of about 20,000 individuals in 12 countries.

[4] The wording of the corresponding SHARE question being: *"About how old were you when you were first told by a doctor that you had high blood pressure?"*

Our methodology is chosen in such a way as to replicate the results of Blanchflower and Oswald (2007), i.e. we first estimate a blood-pressure regression (logit) and then a life satisfaction regression (ordered logit). We then correlate the country coefficients. Finally, we estimate life satisfaction regressions with blood pressure as an explanatory variable. The explanatory variables used in the regressions are country dummies (Belgium is the omitted, base country), age, age squared, a dummy variable for the gender of the respondent, and a set of independent variables as controls for the individual's life experiences before the age of 18 (such as whether the respondent ever had any siblings), the individual's labor force status, stating if the respondent is employed, retired or unemployed, and which kind of job or occupation he has, and a set of dummy variables capturing different forms of marital status.

3. RESULTS

Descriptive statistics on life satisfaction and blood-pressure problems are presented in tables 1a – 1c. With the exception of Greece, we note that the life satisfaction results are strikingly similar to those in Blanchflower and Oswald (2007). More interesting is the comparison of our results relating to blood-pressure problems with those in Blanchflower and Oswald (2007). Taken over all EU countries in the Blanchflower and Oswald (2007) analysis, 69% reported never having had problems of high blood pressure. The percentage of respondents that answered "No" to the question "*Has a doctor ever told you that you had high blood pressure?*" in our analysis is equal to 68%. Most individuals suffering from high blood pressure also take medication (31% of whole population).

Table 1a: Descriptive data on life satisfaction levels (%)

		very satisfied	somewhat satisfied	somewhat dissatisfied	very dissatisfied	missing	N
country	Austria	31.6	57.8	6.2	.7	3.7	1703
	Germany	30.0	57.4	8.7	1.4	2.4	1924
	Sweden	35.8	57.2	3.0	.6	3.5	2158
	Netherlands	58.9	36.4	2.1	.8	1.8	2092
	Spain	42.1	44.4	9.7	1.7	2.1	1560
	Italy	16.1	64.0	11.1	2.4	6.4	1562
	France	15.6	69.5	9.9	1.8	3.2	1235
	Denmark	64.1	27.9	2.4	.3	5.3	1267
	Greece	36.6	51.1	8.7	2.5	1.2	1986
	Switzerland	46.5	45.3	3.8	.5	3.8	739
	Belgium	37.7	54.6	4.1	.9	2.6	2690
	Israel	24.4	53.0	14.9	2.7	5.0	1720
Total		36.5	51.9	6.9	1.4	3.2	20636

Note: Responses are based on the following question: *"How satisfied are you with your life in general: very satisfied, somewhat satisfied, somewhat dissatisfied, or very dissatisfied?"*

Table 1b: Descriptive data on high blood-pressure diagnosis (%)

		No	Yes	N
country	Austria	69.1	30.9	1887
	Germany	64.6	35.4	3004
	Sweden	71.2	28.8	3053
	Netherlands	75.2	24.8	2963
	Spain	65.7	34.3	2382
	Italy	63.9	36.1	2551
	France	72.1	27.9	3120
	Denmark	71.4	28.6	1704
	Greece	67.0	33.0	2896
	Switzerland	74.4	25.6	1000
	Belgium	69.5	30.5	3819
	Israel	58.6	41.4	2596
Total		68.3	31.7	30975

Note: Responses are based on the following question: *"Has a doctor ever told you that you had high blood pressure?"*

Table 1c: Descriptive data on high blood-pressure medication (%)

		No	Yes	N
country	Austria	68.7	31.3	1887
	Germany	65.1	34.9	3004
	Sweden	72.1	27.9	3052
	Netherlands	75.8	24.2	2961
	Spain	67.6	32.4	2381
	Italy	64.1	35.9	2551
	France	69.2	30.8	3118
	Denmark	73.6	26.4	1704
	Greece	67.4	32.6	2896
	Switzerland	72.1	27.9	1000
	Belgium	73.9	26.1	3819
	Israel	58.2	41.8	2595
Total		69.0	31.0	30968

Note: Responses are based on the following question: *"Do you currently take drugs at least once a week for high blood pressure?"*

Table 2 presents the cross-tabulation at the individual level between life satisfaction and high blood-pressure diagnosis. Individuals that are very satisfied with life are also clearly over-represented among individuals without blood-pressure problems (actual 5406 vs. expected 5137; χ^2 equal to 86 with 4 degrees of freedom).

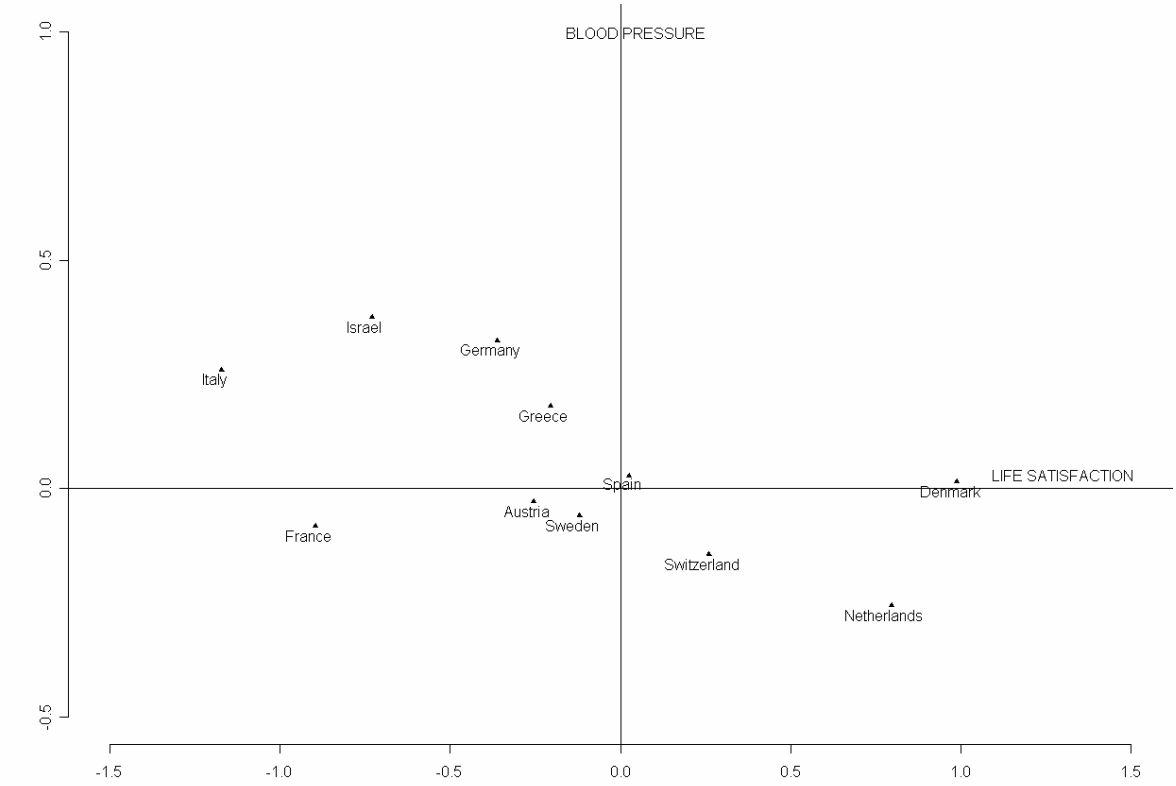
Table 2: Cross-tabulation of blood pressure diagnosis and life satisfaction

			life satisfaction					
			very satisfied	somewhat satisfied	somewhat dissatisfied	very dissatisfied	missing	
high blood pressure	no	N	5406	7137	892	168	458	14061
		Expected	5137,3	7303,8	972,5	190,8	456,6	14061,0
		%	38,4%	50,8%	6,3%	1,2%	3,3%	100,0%
	yes	N	2132	3580	535	112	212	6571
		Expected	2400,7	3413,2	454,5	89,2	213,4	6571,0
		%	32,4%	54,5%	8,1%	1,7%	3,2%	100,0%
		N	7538	10717	1427	280	670	20632
		Expected	7538,0	10717,0	1427,0	280,0	670,0	20632,0
		%	36,5%	51,9%	6,9%	1,4%	3,2%	100,0%

Note: Responses are based on the following questions: *"How satisfied are you with your life in general: very satisfied, somewhat satisfied, somewhat dissatisfied, or very dissatisfied?"* and *"Has a doctor ever told you that you had high blood pressure?"*. χ^2 equal to 86 with 4 degrees of freedom. Spearman correlation equal to 0.060 and significant at the 0.001 level.

We then ran ordered logit life-satisfaction and logit blood-pressure regressions along the lines in Blanchflower and Oswald (2007). In figures 1a and 1b we present the relationship between the country-dummy coefficients in these two regressions for both hypertension variables in our dataset. As in Blanchflower and Oswald (2007) we observe a clear negative relationship between blood-pressure diagnosis and life satisfaction.[5]

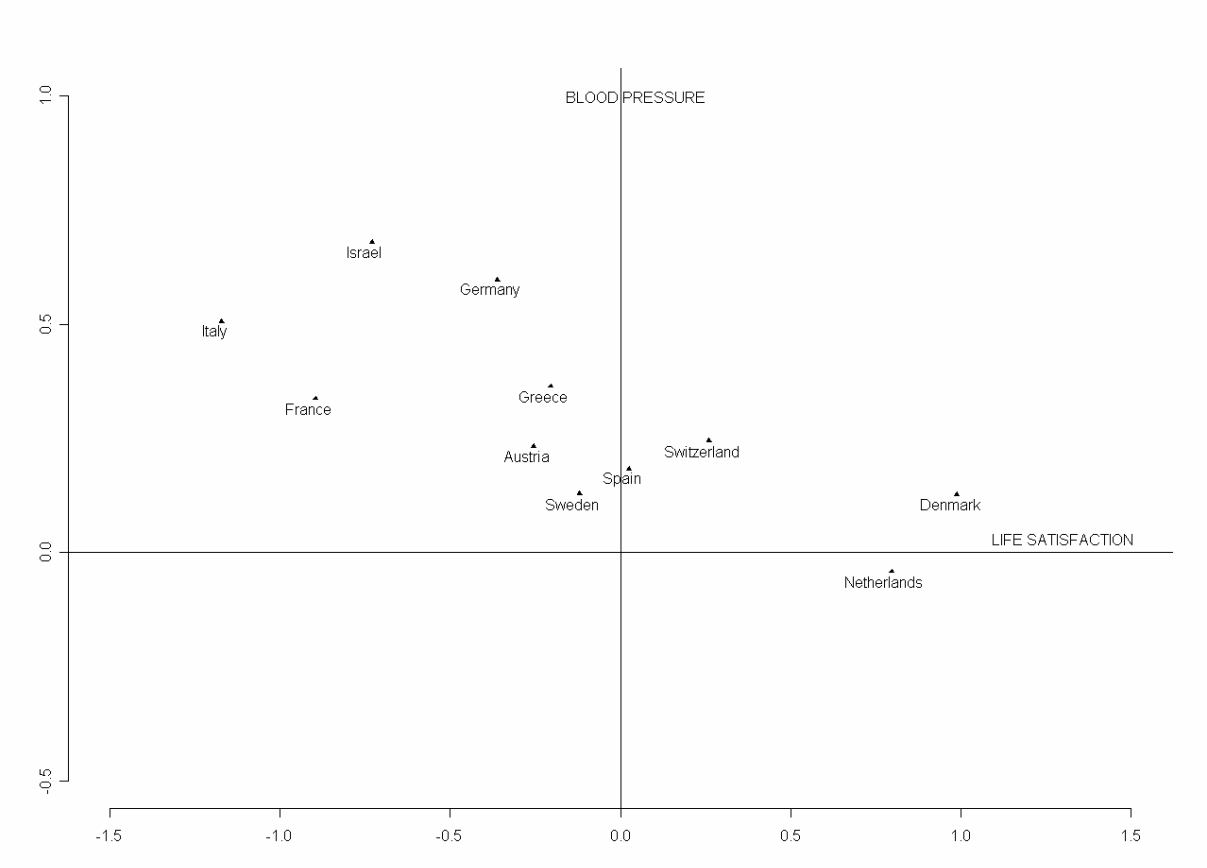
Figure 1a: The inverse correlation between high blood-pressure (diagnosis) and life satisfaction



Note: These points plot country-dummy coefficients. The data are the country coefficients resulting from an ordered logit life-satisfacton regression, and the country coefficients resulting from a logit blood-pressure regression where the blood-pressure dummy reports if the doctor has told the respondent that he has high blood pressure or not. Both regression include personal controls variables (5 dummies relating to the individual's experiences before the age of 18, 11 labour force status dummies, and 6 marital status dummies), gender, age, and age^2.

[5] Regression results available upon request.

Figure 1b: The inverse correlation between high blood-pressure (medication) and life satisfaction



Note: These points plot country-dummy coefficients. The data are the country coefficients resulting from an ordered logit life-satisfacton regression, and the country coefficients resulting from a logit blood-pressure regression where the blood-pressure dummy reports if the respondent currently takes drugs for high blood pressure or not. Both regression include personal controls variables (5 dummies relating to the individual's experiences before the age of 18, 11 labour force status dummies, and 6 marital status dummies), gender, age, and age^2.

Finally, we estimated an ordered life-satisfaction logit model and included our blood-pressure variables as explanatory variables. The results are presented in tables 3a and b. As can be seen, there is a significant negative correlation between high blood-pressure diagnosis and life satisfaction as well as a significant negative correlation between high blood-pressure medication and life satisfaction.

Table 3a: Ordered Logit Life-Satisfaction Equations including a High Blood-Pressure Dummy Variable stating if the doctor has told the respondent that he has high blood pressure

	(1)	(2)	(3)	(4)
Blood-pressure dummy	-.248 ***	-.196 ***	-.160 ***	-.148 ***
Austria		-.274 ***	-.253 ***	-.253 ***
Germany		-.354 ***	-.351 ***	-.350 ***
Sweden		-.059	-.048	-.121 *
Netherlands		.804 ***	.811 ***	.789 ***
Spain		.030	.060	.029
Italy		-1.022 ***	-1.017 ***	-1.163 ***
France		-.886 ***	-.885 ***	-.895 ***
Denmark		.962 ***	.969 ***	.991 ***
Greece		-.133 *	-.127 *	-.199 ***
Switzerland		.284 ***	.294 ***	.258 **
Israel		-.828 ***	-.833 ***	-.719 ***
Age			-.008 ***	-.004 *
Age^2			.000 ***	.000 *
Male			.172 ***	.064 *
Personal controls	No	No	No	Yes
Cut 1	.723	.596	.152	-5.610
Cut 2	-1.876	-2.156	-2.608	-8.440
Cut 3	-2.869	-3.166	-3.619	-9.468
Cut 4	-3.232	-3.532	-3.985	-9.835
Pseudo R^2	.004	.089	.093	.124
N	20632	20632	20632	20632

Notes: "Blood-pressure dummy" is a dummy variable for reporting if the doctor has told the respondent that he has high blood pressure. Personal controls are 5 dummies relating to the individual's experiences before the age of 18, 11 labour force status dummies, and 6 marital status dummies. Pseudo R^2 is calculated following Nagelkerke. Belgium is the reference country.
significant at .05 level, ** significant at .01 level, *** significant at .001 level

Table 3b: Ordered Logit Life-Satisfaction Equations including a High Blood-Pressure Dummy Variable stating if the respondent currently takes at least once a week drugs against high blood pressure

	(1)	(2)	(3)	(4)
Blood-pressure dummy	-.218 ***	.142 ***	.096 **	.090 **
Austria		-.267 ***	-.249 ***	-.249 ***
Germany		-.351 ***	-.351 ***	-.349 ***
Sweden		-.052	-.043	-.117 *
Netherlands		.812 ***	.818 ***	.796 ***
Spain		.032	.061	.029
Italy		-1.017 ***	-1.015 ***	-1.162 ***
France		-.873 ***	-.876 ***	-.886 ***
Denmark		.964 ***	.970 ***	.992 ***
Greece		-.130 **	-.126 **	-.198 ***
Switzerland		.296 ***	-304 ***	.266 ***
Israel		-.825 ***	-.834 ***	-.714 ***
Age			-.008 ***	-.005 *
Age^2			.000 ***	.000 *
Male			.175 ***	.065 *
Personal controls	No	No	No	Yes
Cut 1	.704	.565	.094	-5.482
Cut 2	-1.893	-2.185	-2.664	-8.311
Cut 3	-2.886	-3.194	-3.675	-9.338
Cut 4	-3.249	-3.560	-4.041	-9.705
Pseudo R^2	.003	.088	.092	.123
N	20631	20631	20631	20631

Notes: "Blood-pressure dummy" is a dummy variable for reporting if the respondent currently takes at least once a week drugs against high blood pressure. Personal controls are 5 dummies relating to the individual's experiences before the age of 18, 11 labour force status dummies, and 6 marital status dummies. Pseudo R^2 is calculated following Nagelkerke. Belgium is the reference country.
significant at .05 level, ** significant at .01 level, *** significant at .001 level

4. CONCLUSION

This paper replicates the analysis of the relationship between high blood-pressure problems and life satisfaction in Blanchflower and Oswald (2007) using data from SHARE. It shows that, even with more objective measures of high blood-pressure problems, a significant negative relationship between these measures and life satisfaction is observable.

What neither our study nor the analysis of Blanchflower and Oswald (2007) can assess is the direction of causality – does life satisfaction influence hypertension or vice versa. More importantly, both studies cannot determine the extent to which a kind of selection bias exists, namely that individuals with certain personality traits are more likely to consult their doctors. It is well known that hypertension does not necessarily make people feel worse and that it is thus often not diagnosed or only discover at a routine check-up. If the inclination to consult one's doctor is related to the individual's reporting behavior with regard to life-satisfaction questions, then the observed negative correlation between high blood-pressure problems and life satisfaction may be driven by an individual's unobserved personality traits and less by the incident of high blood-pressure. Ideally, one would need panel data in order to resolve this issue.